

United States Patent

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[54] BAG OPENING APPARATUS

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[51] Int. Cl. B65b 43/36

[58] Field of Search 53/385, 189

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[57]

ABSTRACT

Apparatus for opening plastic bags of the type including opposed side walls of different lengths joined along their lateral sides and one end to define an open ended bag with a tab adjacent the open end. The apparatus disclosed includes a frame assembly with a support surface that can be adjusted to different orientations. The support surface is associated with means for engaging and holding a wicket member that extends through the tabs of a stack of the bags. An air blower is carried by the frame assembly and an air outlet is arranged to direct the air stream across the stack of bags to cause the top bag to be expanded open. Additionally, a resiliently mounted tongue or baffle is carried on the support surface between the air outlet and the stack of bags to maintain the tabs down and assist in directing air into the top bag.

6 Claims, 5 Drawing Figures

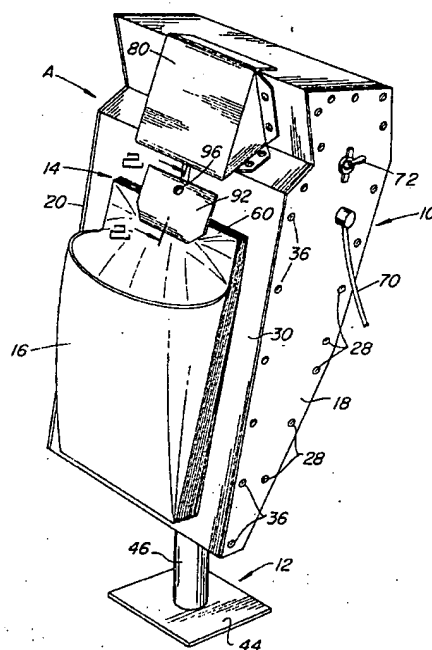


Fig 1

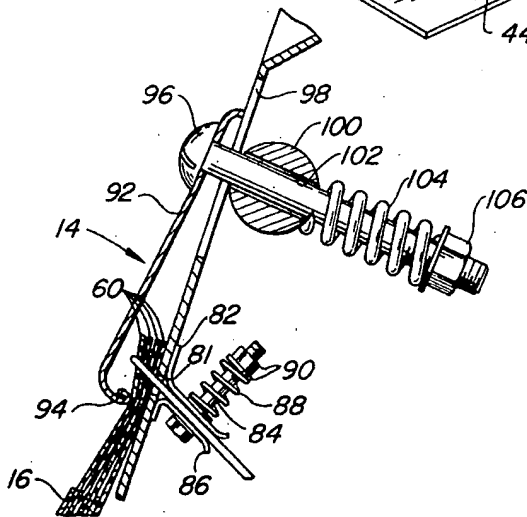
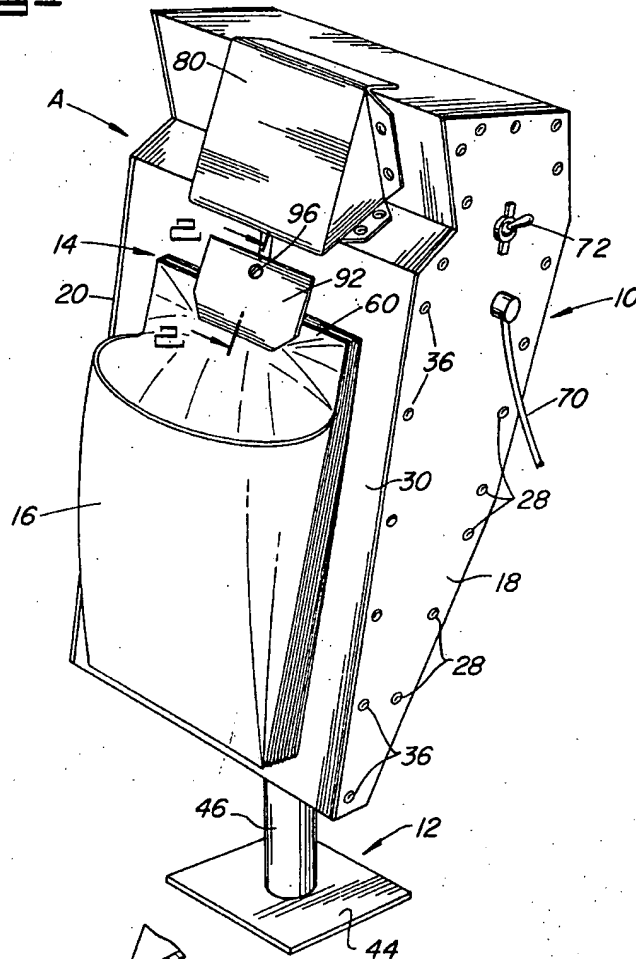


Fig 2

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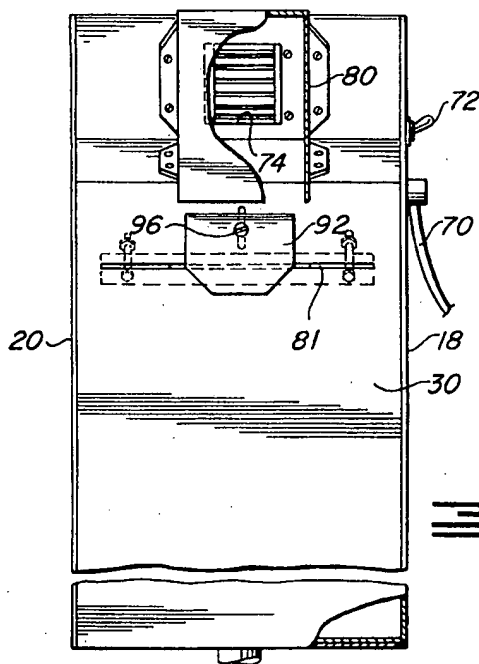
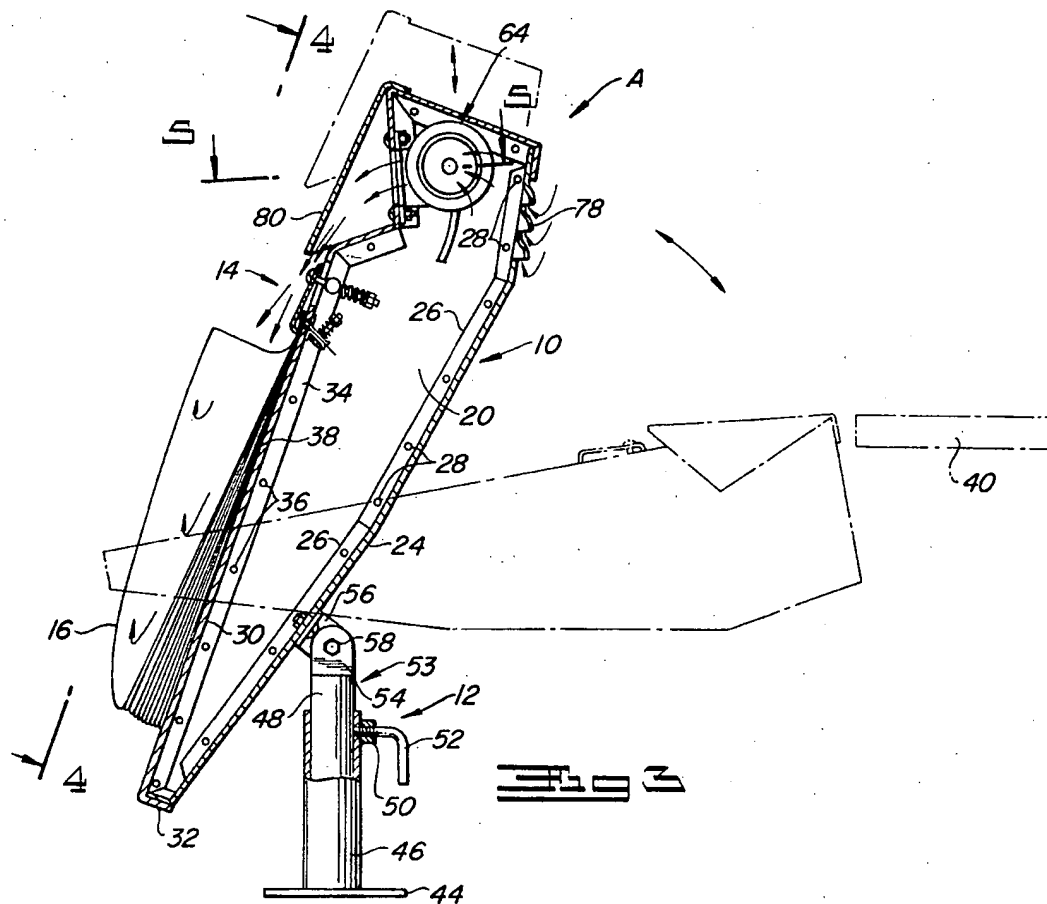


Fig. 2

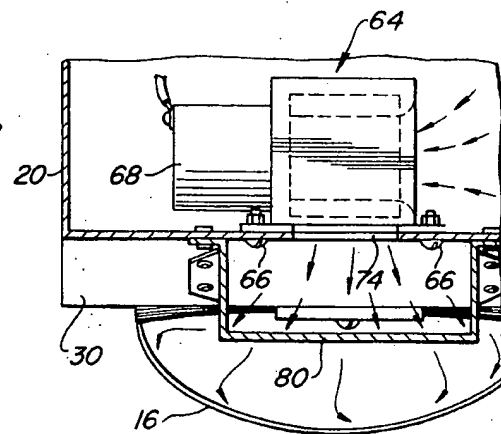


Fig. 3

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BAG OPENING APPARATUS

The present invention is directed to the packaging art and, more particularly, to an improved bag opening apparatus.

The invention is especially suited for opening relatively lightweight plastic bags and will be described with particular reference thereto; however, it will be appreciated that the invention is capable of broader application and could be used for opening many types of bags.

Lightweight, plastic bags are widely used for packaging many types of products. One type of bag which is commonly used has one open end with one side wall extending outwardly of the open end a greater distance than the other. To fill this type of bag, it has been the practice to stack the bags and mount them on a somewhat U-shaped wire wicket which extends through the end of the longer side of the bags. The shorter side wall of the top bag in the stack can thus be moved outwardly to open the bag for filling. After filling, the bag is pulled from the wicket and the next subjacent bag is in position for opening and filling.

Many different bag mounting and automatic opening arrangements have been proposed. None of the prior arrangements however, have been completely satisfactory. For example, the opening mechanisms have often comprised air blowers arranged to direct a jet of air toward the open end of the top bag to expand it to its open position. In some instances, the bags will not open properly and the upper edges of the sides will flutter and flap down. Also, the wickets often had to be continually readjusted as the stack of bags was used.

The present invention overcomes the noted problems and provides an apparatus which is especially suited for opening lightweight plastic bags of the type including opposed side walls of different lengths joined along their lateral edges and one end to define an open ended bag with an outwardly extending tab or flap along the open end. The apparatus preferably comprises a frame means including a bag supporting surface having a peripheral edge with an upper edge portion and a lower edge portion. A wicket engaging and supporting means is carried by the frame adjacent the upper edge portion and functions to support a wicket member in a position to extend outwardly of the bag supporting surface for engaging and holding a stack of bags arranged with their open ends facing generally toward the top edge of the surface and their longer side facing toward the surface. An air outlet means is carried by the frame and is spaced upwardly from the wicket engaging and supporting means in the direction of the top edge portion. The air outlet means functions to direct an air stream across the surface generally toward the lower edge to cause the short side of the top bag in a stack of bags to be blown outwardly to open the bag. Additionally, an air baffle member is positioned on the surface between the air outlet opening and the wicket. The baffle member is resiliently mounted and extends from the surface to a position over the tabs on the stack of bags. Preferably, the baffle member is mounted under a bias toward the surface and acts to hold the longer side of the bags down and assists in directing air into the top bag to facilitate bag opening.

Accordingly, a primary object of the invention is the provision of an automatic bag opening apparatus which has an improved bag holding and air directing arrangement.

Another object is the provision of a bag opening apparatus of the type described wherein an air baffle member functions to hold the bags against the surface and to direct the air toward the top bag.

Yet another object is the provision of an apparatus of the general type described wherein the bags are continually biased into engagement with the bag supporting surface.

A still further object is the provision of an apparatus of the general type discussed in which the filled bags can readily be removed without disturbing the unfilled bags in the stack.

Yet another object is the provision of a bag opening apparatus which is very simple to construct and use.

These and other objects and advantages will become apparent from the following description when read in conjunction with the accompanying drawings wherein;

FIG. 1 is a pictorial elevation of a bag opening apparatus formed in accordance with a preferred embodiment of the invention;

FIG. 2 is a cross-sectional view taken on line 2—2 of FIG. 1 and showing in detail the bag holding and retaining assembly;

FIG. 3 is a longitudinal cross-sectional view through the assembly;

FIG. 4 is a view taken on line 4—4 of FIG. 3 with portions broken away to more clearly show certain details of construction; and,

FIG. 5 is a cross-sectional view taken on line 5—5 of FIG. 3.

Referring more particularly to FIGS. 1 and 3, it will be seen that the bag opening apparatus (A) is comprised of a frame or housing assembly (10) which is adjustably mounted from a support base or stand assembly 12. A bag holding and supporting assembly (4) is carried from the frame 10 and supports a stack of relatively lightweight plastic bags 16. The assembly is arranged so that the top bag in the stack is automatically opened by a stream of air directed downwardly toward the bags.

The frame or housing assembly 10 could have a variety of configurations or differing structural embodiments; however, in the preferred embodiment, it includes a pair of side plate members 18 and 20 having the generally tapered configuration best shown in FIG. 1. The members 18 and 20 are spaced a uniform distance apart and connected with a back member (24). The back member 24 is provided along its vertical edges with flanges 26 which are joined to the side members 18 and 20 in any suitable manner, such as through the use of rivets 28.

The frame 10 also includes a front member (30) which is formed as best shown in FIG. 3. Note that the front member 30 includes a lower flange section (32) which overlaps a similar flange formed on back member 24 to define a closed end wall for the frame. Similarly, the upper end of the front member 30 is bent to define the top of the housing. Flanges 34 are formed along the peripheral edge of the front member 30 and are joined to the side members 18 and 20 through the use of rivets 36. As can be appreciated, the arrangement described forms a hollow, closed housing chamber. Additionally, the front member 30 defines a planar bag supporting surface (38) on which the stack of bags rest during a filling operation.

Preferably, the frame or housing assembly 10 is mounted so that it can be adjusted vertically, as well as pivotally about an axis extending generally horizontal and parallel to the surface 38. This permits the apparatus to be used either in a generally vertical position as shown in FIG. 1 or, at any angle even substantially horizontal as shown by dotted lines in FIG. 3. The combined vertical and pivotal adjustment allows the assembly to be aligned with associated equipment such as an assembly or stacking table surface 40 as shown in FIG. 3. The particular manner in which the adjustment is accomplished is not important to the invention; however, in the embodiment shown, the base assembly 12 includes a first mounting plate (44) which is bolted or otherwise positively connected to a supporting surface such as the floor. A first pipe section 46 is joined to the plate 44 and slidably receives a second pipe section 48. A nut 50 is welded to the side of pipe 46 and threadably receives a handle member 52 which can be tightened to clampingly engage pipe 48. By releasing the handle 52, the assembly can be adjusted to any desired vertical position and the handle retightened. The frame 10 is supported from the upper end of the pipe 48 by a bracket 53 including a first tab portion 54 which is joined to the upper end of pipe 48 in any convenient manner such as by welding. A second member 56 is connected to member 54 by a bolt 58. By releasing the bolt 58 the frame can be shifted to any desired angle of inclination.

As previously mentioned, the apparatus is arranged to open the top bag in a stack of bags positioned on the surface 38. In particular, the bags 16 are, as best shown in FIG. 1, preferably of the type which include a pair of spaced side walls joined along their lateral edges and their lower ends to form a flat open ended bag. One of the side walls has at least a portion which is substantially longer than the other side wall so as to define a tab section 60. As can be seen from FIGS. 1 and 2, the

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bags are stacked with their tabs in alignment and on the same relative side of the bags. Note, as shown in FIG. 2, that the bags are supported from the assembly with their shorter sides facing outwardly. By directing a stream of air downwardly across the bags, the outermost bag in the stack is caused to expand as shown in FIG. 1 and 3. In the subject embodiment, the means for providing the required air stream comprises a small squirrel cage-type blower 64 which is connected to the back of the front wall 30 in any convenient manner such as through the use of machine screws 66. The blower 64 is driven by a small electric motor 68 which is mounted on the blower housing. As shown in FIG. 4, a suitable electric power line or cord 70 is connected through the housing and a toggle switch 72 is provided to control the operation of the motor.

An outlet air opening 74 is formed through the upper end of the front wall 30 and suitable air inlet openings or louvers 78 are formed through the back wall 24 of the housing 10. In order to direct the outlet air from the openings 74 downwardly toward the bags 16, a deflector baffle member 80 is positioned over the outlet opening 74. As best shown in FIGS. 1 and 3, the baffle member 80 is preferably formed from sheet metal and arranged so that its upper edge is received over the top of the housing and connected thereto. The lateral sides are formed inwardly and provided with flanges which are connected to the front face of the wall 30. The air deflector member 80 is spaced outwardly a short distance from the surface 38 as best seen in FIG. 3. Thus, the air supplied from blower 64 is directed downwardly toward the open ends of the bags 16. As can be appreciated, the top bag in the stack is caused to be opened and expanded by the air stream. When the bag is in the expanded position, it can be rapidly filled.

Of particular importance to the invention is the means used for holding the pack of bags to the assembly and assisting in directing the air toward the bag end. As can be appreciated, the bags must be supported so that they may be rapidly connected to the assembly in a stacked position, as well as, permitting the top bag to be individually removed following the filling operation. The usual manner of connecting the bags in this type of device has been through the use of a wire wicket member which extends through the tab sections of the bags and is clamped to the frame. The difficulty with this arrangement has been that the lightweight nature of the bags causes the free ends to tend to bend and interfere with the flow of air thereover. Additionally, as the stack of bags becomes smaller, the wicket must be repositioned at regular intervals. In the subject embodiment, the holding and supporting means comprises a combined wicket and air baffle or tongue arrangement best shown in FIGS. 1 and 2. In particular, the wicket holding portion of the assembly 14 includes a first elongated slot 81 which extends a substantial distance across the surface 30 as shown in FIG. 4. The slot 81 is of a width substantially greater than the thickness of the legs of the wicket and has a spring clamp assembly mounted directly from the back surface of the front wall so as to engage and hold a wicket positioned through the opening 81. The clamp assembly includes a first generally L-shaped member 82 which is joined to the surface of the wall and has a pair of stud bolts 84 extending therethrough at opposite ends of the slot 81. A second clamp member 86 is carried by the stud bolts 84 and is freely movable thereon. The member 86 is maintained under a continual bias toward member 82 by coil springs 88 which are positioned between member 82 and an associated nut and washer 90. Because of the inclined nature of the edges of member 82, the wickets can be merely pushed through opening 80 to cause separation of the two clamp members 82 and 86. The springs 88 maintain a suitable clamp force on the wickets.

As can be understood, the wickets are normally U-shaped configuration and pass through the tabs 60 of the bags 16. Associated with the wicket clamp assembly is an air deflector and bag engaging tongue member 92 which is arranged to

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cover the upper free ends of the bags and continually maintain them biased into a tight stack to prevent interference by their free ends with the normal or desired air flow. As best shown in FIG. 2, the air deflector tongue member 92 has a lower end portion 94 which engages the bags and maintains them clamped into engagement with the surface 38. As shown, the member 92 is supported at its upper end by a stud bolt 96 which extends through the member 92 and an elongated opening 98 in surface 38. A rod member 100 is positioned on the back side of the wall 30 and has an opening 102 through which the bolt 96 passes. A relatively strong coil spring 104 maintains the bolt 96 under a continual bias toward the wall 30. Note that the coil spring 104 extends between the rod 100 and a nut end washer 106 carried on the bolt 96. As can be appreciated, the spring 104 tends to bias the deflector 92 in a counter-clockwise direction about its upper end.

The arrangement of the deflector or tongue member is such that it can be rotated about the stud bolt. This allows it to be lifted and rotated aside when it is necessary to install a new stack of bags.

The invention has been described in great detail sufficient to enable one of ordinary skill in the packaging art to make and use the same. Obviously, modifications and alterations of the preferred embodiment will occur upon a reading and understanding of the specification and it is my intention to include all such modifications and alterations as part of my invention insofar as they come within the scope of the appended claims.

What is claimed is:

1. Apparatus for opening bags of the type including opposed side walls joined along their lateral edges and one end to define an opened ended bag, with one side wall having at least a portion of a length greater than the other to provide an outwardly extending tab portion along the open end, said apparatus comprising:

a frame means including a bag supporting surface having a peripheral edge including an upper edge portion and a lower edge portion;

a wicket engaging and supporting means carried by said frame means for supporting a wicket member to extend outwardly of said bag supporting surface for engaging and holding a stack of said bags arranged with their open end generally facing toward the top edge of said surface and their longer sides toward said surface with the wicket member extending through the tab of said bags;

air outlet means carried by said frame and spaced from said wicket engaging and supporting means in the direction of said top edge for directing an air stream across said surface generally toward said lower edge to cause the short side of the top bag in a stack of bags carried on said surface to be blown outwardly to open said top bag; and,

an air baffle member positioned on said surface between said air outlet opening and said wicket, said baffle member being resiliently mounted and adapted to extend from said surface to a position over the tabs on the stack of bags.

2. The apparatus as defined in claim 1 wherein said air baffle member is resiliently mounted on said surface.

3. The apparatus as defined in claim 1 wherein said wicket engaging and supporting means comprises at least a pair of spring clamp members for engaging opposite sides of a wicket.

4. The apparatus as defined in claim 1 wherein said air baffle member is pivotally mounted and biased toward the surface.

5. The apparatus as defined in claim 1 wherein said frame means is mounted for adjustment about an axis extending parallel to the bag supporting surface.

6. The apparatus as defined in claim 1 wherein said baffle member is mounted for rotation about an axis generally perpendicular to said surface.

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